**Target qualification: MEM20105 Certificate II in Engineering (Based on MEM05v2.2 – October 2010)**

**Target Group:** Students who are enrolled in secondary schools and undertaking study towards the completion of their NSW Higher School Certificate and an AQF qualification in Engineering.

**For implementation: January 2012**

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**SECTION ONE: UNITS OF COMPETENCY INCLUDED IN THIS COURSE**

1. **COMPULSORY UNITS - Attempt ALL units in this section – 170 hours (16 points)**

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| Unit code | Unit title | Unit weight  (points) | Prerequisites | HSC indicative hours of credit |
| N/A | Manufacturing, engineering and related services industries induction | – | – | 10 |
| MEM09002B | Interpret technical drawing | 4 | Nil | 30 |
| MEM12023A | Perform engineering measurements | 5 | Nil | 15 |
| MEM12024A | Perform computations | 3 | Nil | 20 |
| MEM13014A | Apply principles of occupational health and safety in the work environment\* | – | Nil | 15 |
| MEM14004A | Plan to undertake a routine task | – | Nil | 10 |
| MEM15002A | Apply quality systems | - | Nil | 10 |
| MEM15024A | Apply quality procedures | – | Nil | 5 |
| MEM16007A | Work with others in a manufacturing, engineering or related environment | – | Nil | 15 |
| MEM18001C | Use hand tools | 2 | Nil | 20 |
| MEM18002B | Use power tools/hand held operations | 2 | Nil | 20 |

1. **ELECTIVE UNITS - Attempt at least 70 hours from this section and at least 14 points to meet Training Package rules**

|  |  |  |  |  |  |
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|  | Unit code | Unit title | Unit weight  (points) | Prerequisites | HSC indicative hours of credit |
| **Fabrication** | MEM05005B | Carry out mechanical cutting | 2 | MEM12023A  MEM18001C | 5 |
|  | MEM05004C | Perform routine oxy acetylene welding | 2 | Nil | 15 |
|  | MEM05012C | Perform routine manual metal arc welding | 2 | Nil | 20 |
|  | MEM05050B | Perform routine gas metal arc welding | 2 | Nil | 20 |
|  | MEM05003B | Perform soft soldering | 2 | Nil | 15 |
|  | MEM05006B | Perform brazing and/or silver soldering | 2 | Nil | 20 |
|  | MEM05007C | Perform manual heating and thermal cutting | 2 | Nil | 10 |
|  | MEM05049B | Perform routine gas tungsten arc welding | 2 | Nil | 20 |
| **Communication** | MEM16.8A | Interact with computing technology | 2 | Nil | 10 |
| **Assembly** | MEM03003B | Perform sheet and plate assembly | 4 | MEM18001C  MEM18002B | 35 |
|  | MEM03001B | Perform manual production assembly | 4 | Nil | 35 |
| **Casting and moulding** | MEM04018B | Perform general woodworking machine operations | 4 | MEM12023A  MEM18001C | 15 |
| **Machine and process operations** | MEM07032B | Use workshop machines for basic operations | 2 | MEM18001C | 25 |
| **Materials handling** | MEM11011B | Undertake manual handling | 2 | Nil | 5 |
| **Measurement** | MEM12001B | Use comparison and basic measuring devices | 2 | Nil | 10 |
| **Occupational health and safety** | MEM13001B | Perform emergency first aid | 1 | Nil | 10 |
|  | MEM13003B | Work safely with industrial chemicals and materials | 2 | Nil | 10 |

**SECTION TWO: SAMPLE ASSESSMENT PLAN**

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| **CODE** | **UNITS OF COMPETENCY – COMPULSORY** | A | B | C | D | E | F | G | H | I | J | K | L   1. WRITTEN ASSIGNMENTS / TASKS 2. SCENARIOS-PROBLEM SOLVING 3. WRITTEN TEST / EXAMS 4. CASE STUDY 5. TEACHER QUESTIONING 6. OBSERVATIONS OF PRACTICAL WORK 7. DIARY / JOURNAL 8. ROLE PLAY / ORAL PRESENTATIO 9. THIRD PARTY EVIDENCE 10. WORK BOOKS 11. INTERNET RESEARCH |
| N/A | Manufacturing, engineering and related services industries induction | x |  |  |  |  |  | x |  | x | x |  |  |
| MEM13014A | Apply principles of occupational health and safety in the work environment |  |  |  |  |  | x | x |  | x | x |  |  |
| MEM09002B | Interpret Technical Drawings | x |  |  |  |  | x |  |  | x |  |  |  |
| MEM14004A | Plan to undertake a routine task | x |  |  |  |  | x |  |  | x |  |  |  |
| MEM18001C | Use hand tools | x |  |  |  |  | x |  |  | x |  |  |  |
| MEM18002B | Use power tools/hand held operations |  |  | x |  | x | x |  |  |  |  | x |  |
| MEM16007A | Work with others in a manufacturing, engineering or related environment |  |  |  |  |  | x | x | x | x | x |  |  |
| MEM12024A | Perform Computations |  |  | x |  | x | x |  |  |  | x |  |  |
| MEM12023A | Perform Engineering Measurements |  |  | x |  | x | x |  |  |  |  |  |  |
| MEM15002A | Apply Quality Systems |  | x | x |  |  | x |  |  |  |  |  |  |
| MEM15024A | Apply quality procedures |  | x | x |  |  | x |  |  |  |  |  |  |

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| **CODE** | **UNITS OF COMPETENCY-**  **ELECTIVES** | A | B | C | D | E | F | G | H | I | J | K | L |
| MEM05005B | Carry Out Mechanical Cutting | x |  | x |  |  | x | x |  | x |  |  |  |
| MEM05004C | Perform Routine Oxy acetylene welding |  |  | x |  | x | x |  |  | x |  |  |  |
| MEM05012C | Perform Routine Manual arc welding |  |  | x |  |  | x |  |  | x |  |  | 1. WRITTEN ASSIGNMENTS / TASKS 2. SCENARIOS-PROBLEM SOLVING 3. WRITTEN TEST / EXAMS 4. CASE STUDY 5. TEACHER QUESTIONING 6. OBSERVATIONS OF PRACTICAL WORK 7. DIARY / JOURNAL 8. ROLE PLAY / ORAL PRESENTATIO 9. THIRD PARTY EVIDENCE 10. WORK BOOKS 11. INTERNET RESEARCH |
| MEM03003B | Perform Sheet and Plate Assembly |  |  | x |  |  | x |  |  | x |  |  |  |
| MEM05050B | Perform Gas Metal Arc Welding |  |  | x |  |  | x |  |  | x |  |  |  |
| MEM05012C | Perform routine manual metal arc welding |  |  | x |  | x | x |  |  | x |  |  |  |
| MEM05050B | Perform routine gas metal arc welding |  |  | x |  | x | x |  |  | x |  |  |  |
| MEM05003B | Perform soft soldering |  |  | x |  | x | x |  |  | x |  |  |  |
| MEM05006B | Perform brazing and/or silver soldering |  |  | x |  | x | x |  |  | x |  |  |  |
| MEM05007C | Perform manual heating and thermal cutting |  |  | x |  | x | x |  |  | x |  |  |  |
| MEM05049B | Perform routine gas tungsten arc welding |  |  | x |  | x | x |  |  | x |  |  |  |
| MEM16.8A | Interact with computer technology | x | x | x | x | x |  |  |  |  |  |  |  |
| MEM05006B | Perform brazing and/or silver soldering |  |  | x |  | x | x |  |  | x |  |  |  |
| MEM05007C | Perform manual heating and thermal cutting |  |  | x |  | x | x |  |  | x |  |  |  |
| MEM03003B | Perform sheet and plate assembly |  |  | x |  | x | x |  |  | x |  |  |  |
| MEM03001B | Perform manual production assembly |  |  | x |  | x | x |  |  | x |  |  |  |
| MEM04018B | Perform general woodworking machine operations |  |  | x |  | x | x |  |  | x |  |  |  |
| MEM07032B | Use workshop machines for basic operations |  |  | x |  | x | x |  |  | x |  |  |  |
| MEM11011B | Undertake manual handling |  |  | x |  | x | x |  |  | x |  |  |  |
| MEM12001B | Use comparison and basic measuring devices |  |  | x |  | x | x |  |  | x | x |  |  |
| MEM13001B | Perform emergency first aid | x |  | x | x | x | x |  |  |  |  |  |  |

**SECTION THREE:** **DELIVERY AND ASSESSMENT ARRANGEMENTS**

**Duration**

* The course is delivered as a 240 hour course over a 2 year period. This equates to 7 school terms from February to October the following year

**Organisation**

* The course is delivered through a class-based model plus 70 hours of mandatory structured industry based workplace learning.
* The BOS has developed delivery & assessment strategies through Industry Curriculum Consultation committees which have representation from all stakeholders. The BOS has developed Part A & Part B Syllabus documents from the relevant training packages which provide general advice, course structures and performance criteria.
* Teachers work collaboratively to develop teaching/learning programs to meet the needs of their students. Strategies developed focus on holistic assessment through job workplace settings and off-the-job simulated workplace experiences & events.
* This courses is dual accredited. The BOS develops a syllabus which requires additional HSC requirements to enable students to include external HSC exam results in Australian Tertiary Admission Rank calculations.

**Learning Materials to be provided to the student**

* A range of learning materials is provided to students.
* The BOS develops a course Resource List to act as a guide to support delivering teachers.
* Each school has evidence that they satisfy both the **Range Statement** and **Evidence Guide** for each of the units of competency listed in this Learning and Assessment Strategy.
* Schools are responsible for and must ensure that:-
* All VET staff have access to the units of competence and assessment guidelines and qualification packaging rules from the training package
* All VET staff have access to the internet to download the appropriate RTO course delivery and assessment documents from the WSR Vocational Education Wiki Page
* The school has access to staff to assist students with special needs.
* The school annually quality assures that students have access to the equipment and resources as specified in the ICFIP checklists.
* Schools have access to different resources and facilities. If the school uses outside resources, they must provide evidence of an agreement with the resource provider. All NSW DEC qualified VET teachers have access to VET Assess through an agreement with the provider

**Delivery modes**

* The Board of Studies *Special Program of Study* [support document for students with special needs] provides advice and examples for adjustment of learning programs and training and assessment strategies for those students with special needs.

**Assessment**

* Assessment is undertaken using a variety of tools and techniques including observations, third party reports, practical skill tasks and formal written assessments.
* Assessment evidence gathering and recording of competency is continuous throughout the delivery of the course.
* Individual Assessment Events are notified in writing to students in a timely manner.
* Teachers are encouraged to modify assessment tools to meet the needs of their students.

**Evidence Gathering Techniques**

* The matrix in Section 2 identifies the type/s of evidence that is to be collected to enable judgments to be made about student performance with regard to units of competency.

**Assessment Validation Process**

* This RTO involves teachers in assessment validation processes primarily through Industry Curriculum Framework Teacher Networks and through RTO and inter RTO professional development days called VET events.
* The RTO has distributed materials developed through assessment validation workshops to the relevant RTO staff. The validation plan will focus on, local industry input to validation activities.
* School VET coordinators are the facilitators of validation strategies at site delivery level, which may be broadened to incorporate deliveries at other sites.

**Infrastructure**

* All staff involved in the delivery and assessment of this qualification, have direct access through the Office of the Board of Studies to the current version of the relevant Industry Curriculum Framework which contains the Training Package, including the appropriate units of competency, assessment guidelines and qualification structure.
* All staff involved in delivering the program, have access to trainer, assessor and candidate support materials relevant to their areas of delivery and assessment through the BOS website.
* The RTO has access to staff and training/assessment resources to meet the requirements of candidates with special needs and has an assessment process that incorporates reasonable adjustment procedures.
* The RTO, through its website, provides support to schools and staff, through the distribution of relevant course delivery and assessment documents.
* The RTO has reviewed the equipment and facility requirements for each unit of competency in the qualification through the DET Industry Curriculum Framework Information Checklists (ICFIP) Principals declare that staff has access to the plant and equipment needed to implement the program.

**Consultation with Enterprise/Industry**

* Each Board of Studies Industry Curriculum Framework includes 35hrs mandatory work placement for every 120hr course delivery.
* Delivering teachers work directly with workplace hosts to negotiate competencies to be attempted. Teachers utilise third party evidence provided by workplace supervisors and teacher assessment conducted in the workplace.
* The RTO and individual schools consult with local employers as part of assessment validation activities and through teacher networks.
* Partnership Brokers organise Structured Workplace Learning opportunities for the majority of students undertaking VET qualifications.

**Staff**

* The DEC has verified the relevant qualifications of each of the teachers in its employ who will be delivering AQF qualifications and Statements of Attainment and that each teacher has Certificate IV in Training and Assessment or Assessment & Workplace Training. Centralised procedure is available for inspection.
* This RTO utilises networks with ITABs to maintain awareness of the impact of training package changes.
* All newly trained VET teachers to the region are required to attend a regional orientation program.
* RTO structures support relevant experience and industry currency is maintained by trained VET teachers.

**Pathways**

* All students who undertake the **MEM20105 Certificate II in Engineering** are provided with advice on employment and training options through the course teacher and through the school careers adviser.
* The mandatory workplacement provides real work experiences for the student to determine the focus of future pathways. Students may pursue higher certificates with other providers after completion of the Higher School Certificate.

**SECTION FOUR: SCOPE AND SEQUENCE**

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| COURSE NAME | | | | | | | | | | | | | | | Metal and Engineering **MEM20105** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YEAR GROUP | | | |  | | | | | | | | | | | First Year of Delivery | | | | | | | | | | | |  | | | | | | | | | | | | | | | | | TEACHER | | | | | | | | |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **TERM 1** | | | |  | |  | |  | |  | |  | | |  | |  | |  | |  | |  | | | |  | | |  | |  | |  | |  | | | |  | |  |  |  | |  |  | |  | |  | |  | | | | |  | |  | |  | |  | |  | | | |  | |  | | |  | |  | | |  | |  | |  | |  | |  | |  | | | |  | |  | | |  | |  | |  | |
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|  | Manufacturing, Engineering and related services industries Induction (CORE) (10hrs) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| MEM13014A Apply Principals of OH&S in the work environment (CORE) (10hrs) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| MEM09002B Interpret Technical Drawings (CORE) (30hrs) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| **TERM 2** | | | |  | |  | |  | |  | |  | | |  | |  | |  | |  | |  | | | |  | | |  | |  | |  | |  | | | |  | |  |  |  | |  |  | |  | |  | |  | | | | |  | |  | |  | |  | |  | | | |  | |  | | |  | |  | | |  | |  | |  | |  | |  | |  | | | |  | |  | | |  | |  | |  | |
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| MEM14004A Plan to undertake a routine task (CORE) (10hrs) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| MEM18001C Use Hand Tools (CORE) (20hrs) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| MEM18002B Use Power Tools / Hand Held Operations (CORE) (20hrs) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| **TERM 3** | | | | |  |  | |  | |  | |  | |  | | |  | |  | |  | |  | |  | | | |  |  | |  | |  | |  | | | |  | |  | | | | | | |  | |  | |  | | | | |  | |  | |  | |  | |  | | |  | | |  | |  |  | |  | | |  | |  | |  | |  | |  | |  | | |  | | |  | |  |  | |  | |  | |
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| MEM16007A Work with others in a manufacturing, engineering or related environment (CORE) (15hrs) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Preliminary Final Exams | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MEM12024A Perform Computations (CORE) (25hrs) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| **TERM 4** |  | |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  | |  |  |  |  |  | |  |  |  |  |  | |  |  |  |  |  | |  |  |  |  |  |  | |  |  |  |  |  |  | |
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| MEM12023A Perform Engineering Measurements (CORE) (15hrs) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| MEM15002A Apply Quality Systems (CORE) (10hrs) MEM15024A Apply Quality Procedures (CORE) (5hrs) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| MEM05005B Perform Mechanical Cutting (ELECTIVE) (5 hrs) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| COURSE NAME | | | | | | | | | | | | | | | | | | | Metal and Engineering **MEM20105** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YEAR GROUP | | | | | | | | |  | | | | | | | | | | 2nd Year of  Delivery | | | | | | | | | | | | | | | | | |  | | | | | | | | | | | | | | | | | TEACHER | | | | | | | | | | | | | |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **TERM 5** | | | | | | | | |  | |  | |  | |  | |  | |  | | | |  | |  | |  | |  | | | | | | | |  | |  | |  | |  | | |  | |  | |  | |  | |  | |  | | |  | | |  | |  | |  | |  | |  | | |  | |  | |  | |  | |  | |  | | | |  | |  | |  |  | |  | | | |  | |  | |  | |  | | |  | | |  | |  |
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|  | | | MEM05004C Perform Routine Oxy acetylene welding (ELECTIVE) ( 15hrs) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Yr 12 Half Yearly Exams | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MEM05012C Perform Routine Manual Arc Welding (ELECTIVE) (20 hrs) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| **TERM 6** | | | | | | | | | | |  | |  | |  | |  | |  | | |  | | |  | |  | |  | |  |  | |  | |  |  | |  | |  | |  | | | | |  | |  | |  | |  | |  | |  | | | |  | |  | |  | |  | |  | |  | | | | |  | |  | |  | |  | | |  | | |  | |  | | |  | |  | | | |  | |  | |  | |  | | | |  | |  | | |
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| MEM03003B Perform Sheet and Plate Assembly (ELECTIVE) (35 hrs) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| **TERM 7** | | | | | | | | | | | | |  | |  | |  | |  | | |  | | |  | |  | |  | |  |  | |  | |  |  | |  | |  | |  | | | | |  | |  | |  | |  | |  | |  | | | |  | |  | |  | |  | |  | |  | | | | |  | |  | |  | |  | | |  | | |  | |  | | |  | |  | | | |  | |  | |  | |  | | | |  | |  | | |
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| PROJECTS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Trial HSC Exams | | | | | | | | | | | | | | | | | | | | | | | | | HSC Revision and re-assessment of competencies | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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